Ontario

Ontario Ministry of Agriculture Food and Rural Affairs

2008 SUPPLEMENT

Turfgrass Management Recommendations

Publication 384S

This supplement contains changes/additions/deletions to the 2005 edition of Publication 384, *Turfgrass Management Recommendations*. For complete recommendations, please refer to the original publication and include these changes.

PESTICIDE /ADDITIONS/DELETIONS/CHANGES

Table 5–1. Classification of chemicals registered for turfgrass
(replaces Table 5–1, pages 35–36)

Trade name	Common name	LD_{50} (mg ai/kg)[1]	Chemical family
FUNGICIDES			
Arrest	(3) carbithiin/oxycarboxin/thiram	2900/2000/2600	anilide
Banner MAXX	(2) propiconazole	1310	triazole
Cadence 70 WDG	(5) boscolid	5000	anilid
Chipco Aliette Signature	(5) fosetyl-al	2860	aluminum salt
Compass 50WG	(2) trifloxystrobin	5000	strobilurin
Daconil Ultrex	(3) chlorothalonil	10000+	aromatic hydrocarbon
Eagle WSP	(3) myclobutanil	2090	triazole
Heritage MAXX	(2) azoxystrobin	5000+	strobilurin
Insignia EG	(2) pyraclostrobin	>2000	strobilurin
Par Ex 12-2-12 with 15% quintozene	(3) quintozene		aromatic hydrocarbon
Premis 200F	(2) triticonazole	> 2000	triazole
ProTurf DSB 20-3-19 with 1.75% thiophanate-methyl	(3) thiophanate-methyl	7000+	benzimidazole
ProTurf FF II	(3) quintozene		aromatic hydrocarbon
ProTurf Granular Systemic Fungicide	(3) thiophanate-methyl	7000+	benzimidazole
Pro-Turf Granular Fungicide V	(3) chloroneb		substituted benzene
ProTurf Granular Fungicide X	(3) iprodione	3500	dicarboximide
Quintozene (many mg.)	(3) quintozene	1750–2000	aromatic hydrocarbon
Quintozene 75WP	(3) quintozene	1750-2000	aromatic hydrocarbon
Rovral Green GT	(3) iprodione	3500	dicarboximide
Senator 70WP WSB	(3) thiophanate-methyl	7000+	benzimidazole

Table 5–1. Classification of chemicals registered for turfgrass

(replaces Table 5–1, pages 35–36)

Trade name	Common name	LD_{50} (mg ai/kg)[1]	Chemical family
Subdue MAXX	(2) metalaxyl	3436	phenylamide
Supra Captan	(2) captan	9000	phthalimide
Terraclor Flowable Fungicide	(3) quintozene		aromatic hydrocarbon
Terraneb	(3) chloroneb	5000+	chlorinated hydrocarbon
Truban 30 WP	(3) etridiazole	1077	thiadiazole
Turf Pride 7-3-12 with 15% quintozene	(3) quintozene		aromatic hydrocarbon
UAP 0-0-6 with 15% quintozene	(3) quintozene		aromatic hydrocarbon
INSECTICIDES			
Chipco Sevin T&O	(3) carbaryl	400–850	carbamate
Deltagard SC	(2) deltamethrin	700	synthetic pyrethroid
Dursban, Pyrate	(3) chlorpyrifos	135	organophosphate
Merit 0.5G, Merit Solupak	(6) (3) imidacloprid	424–475	chloronicotinyl
Scimitar CS	(2) lambda-cyhalothrin	632–696	synthetic pyrethroid
Success 480SC	(3) spinosad		naturalyte
HERBICIDES AND GROWTH REGULATORS			
Acclaim Super	(3) fenoxaprop-ethyl	335	phenoxy-phenoxy
Basagran	(3) bentazon	1100	benzothiadiazine
Betasan	(3) bensulide	770	benzene sulfonamide
Corn gluten meal (many manufactureres)	(3) corn gluten meal		corn gluten
*Compitox, Mecoprop	(3) mecoprop	930	phenoxy
Dimension	(2) dithopyr	3600	pyridine
2,4-D (many manufacturers)	(2) 2,4-D 2,4-dichlorophenoxyacetic acid (2) 2,4-D/dicamba (2) 2,4-D/dichlorprop (3)*2,4-D/mecoprop (3)*2,4-D/mecoprop/dicamba		phenoxy phenoxy/benzoic acid phenoxy/phenoxy phenoxy/phenoxy phenoxy/phenoxy/benzoic acid
Gramoxone	(2) paraquat	157–207	bipyridylium
MCPA amines	(3) MCPA	700–1000	phenoxy
Primo MAXX	(3) trinexapac- ethyl	5050	cycloproply derivative of cyclohexenone
Roundup	(3) glyphosate	4320	N-(phosphonomethyl) glycine
Royal MH-60 SG	(3) maleic hydrazide		unique
Sarritor Domestic Biological Granular Herbicide	(2) *Sclerotinia minor*		biological
Vanquish	(2) dicamba	1040	benzoic acid
Velocity SP	(3) bispyribac (present as a sodium salt)	2635	pyrimidinyl carboxy

Table 5–1. Classification of chemicals registered for turfgrass

(replaces Table 5–1, pages 35–36)

Trade name	Common name	LD_{50} (mg ai/kg)[1]	Chemical family
OTHER (GOOSE REPELLENT)			
Avigon	(3) methyl-anthranilate	10000	n/a

1. The relative toxicity may be referred to as its LD_{50}.

The numbers in brackets identify the Schedules in which the brand name products are classified:

1. restricted use permit only;
2. restricted to agriculturalists, licensed exterminators and registered custom sprayers;
3. may be available for "domestic" purposes if so registered;
4. domestic products only;
5. limited to application on agricultural land;
6. similar to Schedule 4 but registered for agricultural and commercial use. For more information on regulatory aspects of the classification, please contact your nearest Ministry of Environment office.

*All products containing mecoprop are being phased out. As of 2005, these products will contain mecoprop-p isomer.

Table 5–2. Insect control (replaces Table 5–2, pages 37–39)

Pest	Control (highest LD_{50} products listed first)	Rate/100 m^2	Use enough water for thorough coverage. Follow label instructions.
Annual bluegrass weevil, Hyperodes weevil *(Hyperodes maculicollis)*	*Dursban 2E *Dursban T *Pyrate 480 EC	45 mL 22.5 mL 22.5 mL	Mainly a problem on closely-mowed turf composed mainly of annual bluegrass. Monitor for adults returning to turf when forsythia are in full bloom. Spray suspected problem areas in mid-April and again in mid-May or as recommended.
Ants	Chipco Sevin T&O	210–290 mL	Mow lawns and apply spray. Do not water for two days after treatment. Repeat in two to three weeks if needed.
	Deltagard SC	12 mL	Apply when insects are present or signs of insect feeding are visible. Where heavy infestations occur, a second application may be necessary in two to three weeks. For dense turfgrass canopies and/or turf maintained under high mowing heights, minimum water volumes of 10 L per 100 m^2 or greater are recommended. Delay irrigation or mowing for 24 hours following application. Do not apply more than two times per year.
	*Dursban 2E *Dursban T	45 mL 22.5 mL	Spray when pests first appear; repeat as needed.
	*Pyrate 480 EC	22.5 mL	Spray when pests first appear; repeat as needed. Maximum applications are two per season
	Scimitar CS	3.7 mL	Apply in 8–10 L/100 m^2 of water. Maximum of four applications per year. Apply in spring and late summer. Re-apply after a minimum of seven days if monitoring indicates further applications are required. Maximum of four applications per year.

Table 5–2. Insect control (replaces Table 5–2, pages 37–39)

Pest	Control (highest LD_{50} products listed first)	Rate/100 m^2	Use enough water for thorough coverage. Follow label instructions.
Black turfgrass ataenius *(Ataenius spretulus)* Monitor for adults in clipping baskets or with a soap flush when Van Houtte spirea and horsechestnut are in bloom	**Merit Solupak	1 packet/ 1200 m^2	For optimum control, apply prior to egg hatch of the target pest. For optimum control, if no rainfall within 24 hours after application, irrigate to move the active ingredient through the thatch. On golf courses, irrigate treated areas following application. Avoid mowing turf or lawn areas until after irrigation or rainfall has occurred so that uniformity of application will not be affected. If Merit Insecticide is used for black turfgrass ataenius, Japanese beetle or European chafer, do not re-apply for leatherjacket suppression in the same year.
	Merit 0.5 G	560 g	
Cutworm (various species) Monitor using a soap flush.	Deltagard SC	12 mL	Apply when insects are present or signs of insect feeding are visible. Where heavy infestations occur a second application may be necessary in two to three weeks. For dense turfgrass canopies and/or turf maintained under high mowing heights, minimum water volumes of 10 L per 100 m^2 or greater are recommended. Delay irrigation or mowing for 24 hours following application. Do not apply more than two times per year.
	Chipco Sevin T&O	210–290 mL	Monitor using a soap flush. Mow lawns and apply spray. Do not water for two days after treatment. Repeat in two to three weeks if needed.
	*Dursban 2E	45 mL	Spray when pests first appear; repeat as needed.
	*Dursban T	22.5 mL	
	*Pyrate 480 EC	22.5 mL	Spray when pests first appear; repeat as needed. Maximum applications are two per season.
European chafer *(Rhizotrogus majalis)*	**Merit Solupak	1 packet/ 1200 m^2	For optimum control, apply prior to egg hatch of the target pest. For optimum control, if no rainfall within 24 hours after application irrigate to move the active ingredient through the thatch. On golf courses, irrigate treated areas following application. Avoid mowing turf or lawn areas until after irrigation or rainfall has occurred so that uniformity of application will not be affected. If Merit Insecticide is used for black turfgrass ataenius, Japanese beetle or European chafer, do not re-apply for leatherjacket suppression in the same year.
	Merit 0.5 G	560 g	
	Chipco Sevin T&O	210–290 mL	Apply to the early instar stage of the grub. Irrigate after application to ensure movement into root zone. Remove excessive thatch and irrigate 24 hours before treatment if soil is dry.
June beetle grubs *(Phyllophaga spp.)*	There are currently no insecticides registered for use against June beetle grubs.		

Table 5–2. Insect control (replaces Table 5–2, pages 37–39)

Pest	Control (highest LD_{50} products listed first)	Rate/100 m^2	Use enough water for thorough coverage. Follow label instructions.
Hairy chinch bug *(Blissus leucopterus hirtus)* The smaller stages of chinch bug nymphs are easiest to control. If damage was significant the previous year, apply when damage or large numbers of chinch bugs are noticed	Deltagard SC	12 mL	Apply when insects are present or signs of insect feeding are visible. where heavy infestations occur a second application may be necessary in two to three weeks. For dense turfgrass canopies and/or turf maintained under high mowing heights, minimum water volumes of 10 L per 100 m^2 or greater are recommended. Delay irrigation or mowing for 24 hours following application. Do not apply more than two times per year.
	Chipco Sevin T&O	210–290 mL	Mow lawns and apply spray. Do not water for two days after treatment. Repeat in two to three weeks if needed.
	*Dursban 2E *Dursban Turf	45 mL 22.5 mL	Spray when pests first appear; repeat as needed.
	*Pyrate 480 EC	22.5 mL	Spray when pests first appear; repeat as needed. Maximum of 2 applications per season.
Japanese beetle	**Merit Solupak Merit 0.5 G	1 packet/ 1200 m^2 560 g	For optimum control, apply prior to egg hatch of the target pest. For optimum control, if no rainfall within 24 hours after application irrigate to move the active ingredient through the thatch. On golf courses, irrigate treated areas following application. Avoid mowing turf or lawn areas until after irrigation or rainfall has occurred so that uniformity of application will not be affected. If Merit Insecticide is used for black turfgrass ataenius, Japanese beetle or Eurpean chafer, do not re-apply for leatherjacket suppression in the same year.
Leatherjackets (larvae of European crane fly *Tipula paludosa*)	**Merit Solupak Merit 0.5 G (suppression only)	1 packet/ 1200 m^2 560 g	For suppression of early fall larval stages of crane fly (leatherjackets) apply to turfgrass areas known to be infested with leatherjackets. Begin applications when adult crane flies take flight in August and September and begin laying eggs.
	Chipco Sevin T & O (all turf uses)	200 mL	Apply in 150–200 L/100 m^2 or for small areas 1.5–3 L/100 m^2 and irrigate. Apply only once per year. For spot treatment only in residential areas. Do not treat a residential area larger than 100 m^2. Treatment should be considered at or above 270 larvae per m^2.
	*Dursban T *Pyrate 480 EC	20–25 mL 20–25 mL	Apply as drenching spray in water in late fall after the flight of adult crane flies has ceased.
Sod webworm, cranberry girdler and lawn moths (various species)	Success 480 S	0.5–1.0 mL	Treat in early morning or early evening. Do not re-apply within less than seven days. Do not water for two days after application. Do not mow turf for one to three days after treatment. Do not exceed four applications/year.

Table 5–2. Insect control (replaces Table 5–2, pages 37–39)

Pest	Control (highest LD_{50} products listed first)	Rate/100 m^2	Use enough water for thorough coverage. Follow label instructions.
Sod webworm, cranberry girdler and lawn moths (*cont'd*)	Deltagard SC	12 mL	Apply when insects are present or signs of insect feeding are visible. Where heavy infestations occur a second application may be necessary in two to three weeks. For dense turfgrass canopies and/or turf maintained under high mowing heights, minimum water volumes of 10 L per 100 m^2 or greater are recommended. Delay irrigation or mowing for 24 hours following application. Do not apply more than two times per year.
	Chipco Sevin T&O	210–290 mL	Mow lawns and apply spray. Do not water for two days after treatment. Repeat in two to three weeks if needed.
	*Dursban 2E	45 mL	Delay watering or mowing the treated area for 12–24 hours after treatment.
	*Dursban Turf *Pyrate 480 EC	22.5 mL 22.5 mL	Delay watering or mowing the treated area for 12–24 hours after treatment.

* Do not use products containing chlorpyrifos (Dursban 2E, Dursban T, Pyrate 480 EC) in and around homes or residential areas such as parks, school grounds and playing fields. These products can be used only on golf courses, industrial sites, highway medians and sod farms.

**Merit Solupak and Merit 0.5 G are now labeled for all turf uses, including sod farms

Formulations: E: Emulsion EC: Emulsifiable concentrate F: Flowable CS: Capsule suspension SC: Suspension concentrate T&O: Turf and Ornamental WG: Water dispersible granule WP WSB: Wettable powder water soluble bag

Table 5–3. Disease control (replaces Table 5–3, pages 40–47)

Disease and cultural control	Chemical control (highest LD_{50} products listed first)	Rate/100 m^2	Interval (days)	Use enough water for thorough coverage. Follow label directions.
Algae Improve fertility and drainage. Alleviate compaction				
Anthracnose (*Colletotrichum graminicola*) Occurs June to September under humid and warm conditions. Avoid nitrogen deficiency, drought stress, soil compaction, poor drainage and excessive thatch, especially on annual bluegrass.	Daconil Ultrex	103–115 mL	7–10	Recommended rates are for preventing disease establishment; use lower rate when disease conditions are light to moderate, higher rates when conditions are severe.
	*Heritage MAXX	32–63 mL	14–28	Use preventively. Begin applications when conditions are favourable for disease infection, prior to disease symptom development.

Table 5–3. Disease control (replaces Table 5–3, pages 40–47)

Disease and cultural control	Chemical control (highest LD_{50} products listed first)	Rate/100 m^2	Interval (days)	Use enough water for thorough coverage. Follow label directions.
Anthracnose (*cont'd*)	Chipco Aliette® Signature	120 g	14	Apply two to four times,14 days apart as a preventative treatment in spring and/or summer to turfgrass areas with a history of anthracnose disease development. Use in conjunction with a fertility program that avoids excess, yet provides adequate nitrogen through light, frequent applications over the entire growing season. Under extreme prolonged infection pressure, should be used as a part of a season-long spray program with other fungicides registered for use on anthracnose.
	*Premis 200 F	16–32 mL	14–21	Apply at the first sign of anthracnose and/or when environmental conditions are favourable for disease development. Use the higher rate when anthracnose pressure is high. Do not apply more than three applications per season.
	*Banner MAXX	26–51 mL	21	Apply when warm humid weather conditions occur. Do not apply more than three times a season.
Anthracnose foliar blight *(Colletotrichum graminicola)*	*Compass 50WG	3.8 g	14	Apply preventative applications when conditions are favourable for disease development. Rotate with different mode of action fungicides registered for foliar anthracnose control. Do not apply more than two sequential applications for all diseases. Do not apply more than 24 g/100 m^2/yr.
Anthracnose basal rot *(Colletotrichum graminicola)*	*Compass 50WG	4.6 g	14–21	Apply preventative applications in spring, summer or fall when conditions are favourable for disease development. Rotate with different mode of action fungicides registered for anthracnose basal rot control. Use shorter spray interval under high disease pressure. Do not apply more than two sequential applications for all diseases. Do not apply more than 24 g/100 m^2/yr.
Bentgrass dead spot *(Ophiosphaerella agrostis)*	Chipco Aliette® Signature	120 g	14	Apply two to four times14 days apart as a preventative treatment in spring and/or summer to turfgrass areas with a history of bentgrass deadspot disease. Begin when conditions are favourable for disease development. Under extreme prolonged infection pressure, Aliette should be used as part of a season-long spray program with other fungicides registered for bentgrass deadspot control.

Table 5–3. Disease control (replaces Table 5–3, pages 40–47)

Disease and cultural control	Chemical control (highest LD_{50} products listed first)	Rate/100 m^2	Interval (days)	Use enough water for thorough coverage. Follow label directions.
Brown patch, Rhizoctonia blight (*Rhizoctonia solani*) Occurs under humid, warm conditions and extended periods of leaf wetness in June to September. Avoid excess nitrogen and night watering.	Daconil Ultrex	58–115 g (preventative)	7–14	Apply when conditions are favourable for disease development and repeat applications as long as conditions persist.
	Daconil Ultrex	115–212 g (curative)	7–14	See remarks above for preventative rates for Daconil Ultrex. Under severe disease conditions, use the curative rates and spray on a seven day schedule.
	*ProTurf DSB with thiophanate-methyl	0.86 kg	14–21	Apply to moist or dry foliage.
	*Senator 70 WP WSB	30–60 g	5–7	Apply after mowing or avoid mowing for 12 hours after application. Begin ground applications when diseases first appear. When disease pressure is severe, apply at higher rate.
	ProTurf Granular Systemic Fungicide	0.66–1.32 kg	14–21	For prevention apply to moist or dry foliage at normal rate when disease activity is noted or suspected. May require more frequent treatments under conditions that favour the disease. To arrest the disease, apply at the highest rate.
	*Heritage MAXX	32 mL	14–28	Begin applications before disease is present (usually late May to June) when conditions favour disease development (high surface moisture or humidity and warm night temperatures). During prolonged periods of favourable conditions apply on the shorter application interval.
	*Compass 50 WG	4.6–6.1 g	14–21	Apply when conditions are favourable for disease development. Apply 4.6 g/100 m^2 at 21 day intervals under low disease pressure and 6.1 g/100 m^2 at a 14 day interval under high disease pressure. Do not apply more than two sequential applications for all diseases. Do not apply more than 24 g/100 m^2/yr.
	ProTurf Granular Fungicide X	2.34–3.52 kg	14	To prevent disease, apply at the normal to heavy rate to moist or dry turf when disease activity is anticipated and repeat at two-week intervals. If disease pressures are heavy, apply at the heavy rate to moist or dry foliage. When diseases are brought under control, revert back to bi-weekly normal rate applications. To control disease apply to moist or dry foliage at

Table 5–3. Disease control (replaces Table 5–3, pages 40–47)

Disease and cultural control	Chemical control (highest LD_{50} products listed first)	Rate/100 m^2	Interval (days)	Use enough water for thorough coverage. Follow label directions.
Brown patch, Rhizoctonia blight (*cont'd*)	ProTurf Granular Fungicide X (*cont'd*)			the heavy rate as soon as disease activity is noticed. Repeat bi-weekly until disease is under control, then revert to the normal or heavy rate applications bi-weekly.
	Rovral Green GT	125–250 mL	14–21	Apply at first signs of disease. Under severe pressure use the higher rate and the shorter interval. Rotate with other fungicides to reduce the possibility of developing resistance.
	*Eagle WSP	18 g	14	Apply a maximum of four times a year.
	*Premis 200 F	32 mL	14–21	Apply at the first sign of disease development when environmental conditions are favourable for disease development. Repeat every 14 days when disease conditions exist. Do not apply more than three times per season.
	*Insignia EG	14–25 g	14–21	Apply when conditions are favourable for disease development.
	Terraclor FF	135–185 mL	7–10	Apply at first sign of disease. Repeat during warm, damp weather. Water area lightly with 6 mm of irrigation or rainfall.
	*Banner MAXX	51–103 mL	14	Apply preventively when conditions favour disease development. Use the higher rate under severe disease pressure. Do not apply if disease symptoms are present. Do not apply more than six times a season.
Cool season brown patch, yellow patch (*Rhizoctonia cerealis*) Occurs April to May and September to November.	*Banner MAXX	77–103 mL		Apply once in late fall before snow cover. Do not apply on top of snow. Do not apply more than once a season.
Rhizoctonia zeae	*Insignia EG	14–25 g	14–21	Apply when conditions are favourable for disease development.
Dollar spot (*Sclerotinia homoeocarpa*) Occurs June to September under humid and warm conditions. Begins when iris and peony are in full bloom. Avoid nitrogen deficiency, drought stress, soil compaction and excessive thatch, especially on annual bluegrass. Light frequent application of foliar-applied nitrogen will decrease the severity.	Daconil Ultrex	29–58 g (fairways)	7–14	Preventive rates are for preventing disease establishment; use lower rate when disease conditions are light to moderate, higher rates when conditions are severe. Daconil Ultrex can be tank mixed at 115 g/100 m^2 with Banner MAXX at a rate of 30 mL/100 m^2. Read the Daconil Ultrex and Banner MAXX labels for details.
		58–15 g (greens and tees, ornamental turfgrass preventive)	7–14	
		115–212 g (greens and tees, ornamental turfgrass curative)	7–14	

Table 5–3. Disease control (replaces Table 5–3, pages 40–47)

Disease and cultural control	Chemical control (highest LD_{50} products listed first)	Rate/100 m^2	Interval (days)	Use enough water for thorough coverage. Follow label directions.
Dollar spot (*cont'd*)	ProTurf Granular Systemic Fungicide	0.66–1.32 kg	14–21	For prevention, apply to moist or dry foliage at normal rate when disease activity is noted or suspected.
	*Senator 70 WP WSB	25–30 g	10–14	Apply after mowing or avoid mowing for 12 hours after application. Begin ground applications when diseases first appear. When disease pressure is severe, apply at the higher rate.
	*ProTurf DSB with thiophanate-methyl	0.86 kg	14–21	Apply to moist or dry foliage. If dollar spot is not effectively controlled a thiophanate-methyl or benomyl-tolerant strain of fungi may be present.
	Cadence 70 WDG	3.2–4.0 g	14	Apply prior to or in the early stages of disease development. Apply in 5–15 L of water/100 m^2. Do not exceed two consecutive applications before using another mode of action for at least one application. Do not apply more than six times a season.
	ProTurf Granular Fungicide X	2.34–3.52 kg	14	To prevent disease, apply at the normal to heavy rate to moist or dry turf when disease activity is anticipated and repeat at two-week intervals. If disease pressure is heavy, apply at the heavy rate to moist or dry foliage. When diseases are brought under control, revert back to bi-weekly normal rate applications. To control disease, apply to moist or dry foliage at the heavy rate as soon as disease activity is noticed. Repeat bi-weekly until disease is under control, then revert to the normal or heavy rate applications bi-weekly.
	Rovral Green GT	62 mL	21	Apply at the first signs. Repeat as required. Alternate with other fungicides to reduce possibility of developing resistance.
	*Eagle 40 WSP	15–20 g	14–21	Start applications before or immediately after the first signs of disease. Do not apply more than four times a year. Under conditions optimum for severe disease development the spray interval between fungicide applications should be shortest and at the highest rate.
	*Premis 200 F	16 mL	14–21	Apply at the first sign of dollar spot or when environmental conditions are favourable for dollar spot development. Repeat every 14–21 days to maintain control.

Table 5–3. Disease control (replaces Table 5–3, pages 40–47)

Disease and cultural control	Chemical control (highest LD_{50} products listed first)	Rate/100 m^2	Interval (days)	Use enough water for thorough coverage. Follow label directions.
Dollar spot (*cont'd*)	*Banner MAXX	26–51 mL	21–28	Apply during periods of humid, warm days and cool nights that favour heavy dew formation. Rotate with fungicides that have a different mode of action. Do not apply more than six times a season. Banner MAXX can be tank mixed with Heritage at 26–51 mL/100m^2 or with either Daconil or Primo MAXX. Read the Banner MAXX, Daconil and Primo MAXX labels.
Fairy ring	*Heritage MAXX	63 mL	28	Apply as soon as symptoms develop. May take two to three weeks to disappear. Severely damaged turf may need reseeding.
Fusarium patch *(Microdochium nivale)* Avoid excess nitrogen and remove dew.	*Heritage MAXX	32 mL	14–28	Apply when conditions are favourable for disease development, i.e., extended period of cool (<15.5°C) and wet weather in spring and fall.
	*Compass 50 WG	3.8 g	14	Apply in early spring and fall when conditions are favourable for disease development or when disease is present after snow melt. For curative applications apply on a 14-day interval, two to three times. Do not apply more than twice in a row. Do not apply more than 24 g/100 m^2/yr.
	Rovral Green GT	185 mL	21–28	Apply in spring and fall for prevention when cool and wet conditions exist.
	Par-Ex 12-2-12 (with quintozene)	1.5 kg		An application in early spring may be required if cold, wet weather persists.
	*Banner MAXX	51–103 mL	30	Apply in the fall or early spring during cool, wet weather. Use the high rate only under high disease pressure. Do not apply more than twice a season.
Grey snow mould, Typhula blight *(Typhula spp.)* Avoid succulent turf growth in late fall. Keep turf mowed until leaf growth ceases. Use snow fencing or other methods to prevent excessive snow accumulation. Minimize thatch as this is a perfect environment for dormant sclerotia.	Arrest 75 W	250–375 g in a dry mixture with 2–5 kg of organic carrier e.g. sewage sludge		One application. Reapply if it rains after treatment or if thaws occur during winter.
	Daconil Ultrex	145–303 g		
	*Heritage MAXX (*Typhula incarnata* control only)	95–126 mL	1 fall application	Apply in late fall before snow cover. Do not apply on top of snow. Use the higher rate if there is a history of severe snow mould infection.

Table 5–3. Disease control (replaces Table 5–3, pages 40–47)

Disease and cultural control	Chemical control (highest LD_{50} products listed first)	Rate/100 m^2	Interval (days)	Use enough water for thorough coverage. Follow label directions.
Grey snow mould, Typhula blight (*cont'd*) Control with a single application late in fall before permanent snow cover, early to late November in southern Ontario, mid-late October in northern Ontario.	*Compass 50 WG	6.1 g tank-mixed with 271–345 mL of Rovral Green GT	One application applied just before permanent snow cover	Apply preventative tank-mix application in a minimum of 5 L spray solutions (6.10–7 L/100 m^2 recommended) in late fall before permanent snow cover or tarping. The high rate of Rovral Green GT (maximum of 354 mL/100 m^2) should be used with 6.1 g/100 m^2 of Compass. If turfgrass area has a history of heavy grey snow mould pressure and/or a heavy or long snow cover, apply a DMI product or other registered grey snow mould fungicide product in mid to late fall as part of an overall snow mould season control strategy.
	Terraneb SP	175–275 g		Apply as late in the fall as possible.
	ProTurf Fungicide V	1.4–2.9 kg		Apply to dry or moist foliage prior to first heavy snow fall. Repeat in mid-winter if turf is free of snow. A final treatment in late winter as the snow melts extends protection. Apply the highest rate in areas where snow cover is present the entire winter.
	ProTurf Granular Fungicide X	1.17–2.34 kg (light to normal rate) 2.34–3.52 kg (normal to heavy rate)	14–21	To prevent disease, apply at the light or normal rate to dry foliage when disease activity is anticipated. For suppression of disease, apply to dry foliage at the normal or heavy rate prior to the first snow. Repeat in mid-winter when turf is free of snow and again immediately after the final snow melt in the spring.
	Rovral Green GT	375 g		Apply as a preventive treatment in late fall or early winter just before ground freezes or before the first snow fall.
	*Eagle WSP	30g		Apply only once a year.
	Insignia EG	17 g	Single application	Make a single application of 17 g or two applications of 8.5 g, 14–28 days apart in late fall just prior to snow cover.
		8.5 g	14–28	
	Par-Ex 12-2-12 with quintozene	1.5 kg		Apply as late in fall as possible.
	ProTurf FF II	1.55–3.1 kg		In areas where snow cover is present the entire winter use the high rate.
	Quintozene 75WP	250 g		After treatment, water area lightly. Do not feed clippings or treated grass to livestock. Do not use on pasture grass.

Table 5–3. Disease control (replaces Table 5–3, pages 40–47)

Disease and cultural control	Chemical control (highest LD_{50} products listed first)	Rate/100 m^2	Interval (days)	Use enough water for thorough coverage. Follow label directions.
Grey snow mould, Typhula blight (*cont'd*)	Turf Pride 7-3-12 with 15.4% quintozene	1.5 kg		Use as part of a complete fertilizer program. Where snow cover is present the entire winter, use double the recommended rate. A slight, temporary discolouration may occur following application. Do not feed clippings of treated grass to livestock. Do not use on pasture grass. Do not get product on operator or use on a windy day.
	UAP 0-0-6 with 15% quintozene	1.5–1.6 kg		
	Terraclor FF	370 mL		With applications made in less than 20 L of water per 100 m^2, the area should receive at least 6 mm of irrigation or rainfall prior to snow cover. Natural precipitation is usually enough.
	*Banner MAXX	206 mL		Do not apply on top of snow or when the temperature is below 0°C. Do not apply more than once a season.
Helminthosporium Leaf spot Melting Out *(Drechslera spp.)* Avoid early spring applications of nitrogen. Raise mowing height.	Daconil Ultrex	58–115 g (preventive greens, tees)	7–14	Apply when conditions favour disease development and repeat applications as long as the conditions persist. Under severe disease conditions, use the curative rates and spray on a seven day schedule.
		115–212 g (curative greens, tees)	7–14	
		95–190 mL (fairways)	7–14	
	*Heritage MAXX	32–63 mL	14–28	Initiate applications when conditions are favourable for disease development. Apply lower rate at 14-day intervals or higher rates at 28-day intervals
	*Compass 50WG	3.1 g	14–21	Apply when conditions are favourable for disease development. Use short interval under high disease pressure. Do not apply more than twice in a row. Do not apply more than 24 g/100 m^2/yr.
	Rovral Green GT	125 mL	14–21	Apply at the first sign of leaf spot. Repeat two to three times in early spring. Under severe disease pressure use the shorter spray interval. Alternate with other fungicides to reduce possibility of developing disease resistance.
	*Insignia EG	15.4 g	14	Apply when conditions are favourable for disease development.
	ProTurf Granular Fungicide X	1.17 kg (light rate) 2.34–3.52 kg (normal to heavy)	21–28	Apply to moist or dry turf at the preventive rate when disease activity anticipated. Repeat if needed. Apply to moist or dry foliage at the normal to heavy rate when disease activity is first noticed. Repeat as needed at intervals

Table 5–3. Disease control (replaces Table 5–3, pages 40–47)

Disease and cultural control	Chemical control (highest LD_{50} products listed first)	Rate/100 m^2	Interval (days)	Use enough water for thorough coverage. Follow label directions.
				not closer than two weeks.
Helminthosporium Leaf spot Melting Out *(cont'd)*	*Banner MAXX	51–103 mL	14	Under light to moderate disease pressure, apply to reduce severity. Do not apply more than three times per season.
Low-temperature Basidiomycetes	Arrest 75 W	250–375 g as a spray in 15–50 L of water or in a dry mixture with 2–5 kg of organic carrier e.g.sewage biosolids		These diseases require snow cover for activity. Control with a single application late in fall before permanent snow cover, early to late November in southern Ontario, mid-late October in northern Ontario.
Pink Snow Mould *(Microdochium nivale)* Avoid succulent turf growth in late fall. Keep turf mowed until leaf growth ceases. Use snow fencing or other methods to prevent excessive snow accumulation. Minimize thatch	Arrest 75 W	250–375 g as a spray in 15–50 L of water or in a dry mixture with 2–5 kg of organic carrier e.g. sewage biosolids		One application. Reapply if it rains after treatment or it thaws during winter.
	Daconil Ultrex	145–303 g		
	*ProTurf DSB with thiophanate-methyl	860 g		Apply when disease activity is expected.
	*Senator 70 WP WSB	125–175 g		Apply after mowing or avoid mowing for 12 hours after application. Begin ground applications when diseases first appear. When disease pressure is severe, apply at the higher rate. Repeat when needed.
	*Heritage MAXX	95-126 mL	1 fall application	Apply in late fall before snow cover. Do not apply on top of snow. Use the higher rate if there is a history of severe snow mould infection.
	*Compass 50 WG	6.1 g tank-mixed with 271–345 mL of Rovral Green GT	One application just before permanent snow cover	Apply preventative tank-mix application in a minimum of 5 L spray solutions (6.1–7.L/100m^2 recommended) in late fall before permanent snow cover or tarping. The high rate of Rovral Green GT (maximum of 354 mL/100 m^2) should be used with 6.1 g/100 m^2 of Compass. If turfgrass area has a heavy Microdochium patch and/or pink snow mould disease pressure, implement an early and mid-fall fungicide spray program prior to applying the final pink snow mould control tank mix.

Table 5–3. Disease control (replaces Table 5–3, pages 40–47)

Disease and cultural control	Chemical control (highest LD_{50} products listed first)	Rate/100 m^2	Interval (days)	Use enough water for thorough coverage. Follow label directions.
	*Insignia EG	25 g	Single application	Make a single application in late fall just prior to snow cover.
Pink Snow Mould (*cont'd*)	Par-Ex 12-2-12 with quintozene	1.5 kg		Apply as late in fall as possible but before permanent snowfall.
	ProTurf FF II	1.55–3.1 kg		Apply before the first heavy snow fall. Where snow cover is present the entire winter use the high rate.
	Quintozene 75WP	250 g		Following treatment, water lightly. Do not feed clippings or treated grass to livestock. Do not use on pasture grass.
	Turf Pride 7-3-12 with 15.4% quintozene	1.5 kg		Use as part of a complete fertilizer program. Where snow cover is present the entire winter, use double the recommended rate. A slight, temporary discolouration may occur following application. Do not feed clippings of treated grass to livestock. Do not use on pasture grass. Do not get product on operator or use on a windy day.
	UAP 0-0-6 with 15% quintozene	1.5–1.6 kg		
	Terraclor FF	370 mL		Apply before snowfall. With applications made in less than 20 L of water per 100 m^2, the area should receive at least 6 mm of irrigation or rainfall prior to snow cover. Natural precipitation is usually enough.
	ProTurf Granular Fungicide X	1.17–2.34 kg (light-normal rate) 2.34–3.52 kg (normal-heavy rate)	14–21	To prevent disease, apply at the light or normal rate to dry foliage when disease activity is anticipated. For suppression, apply to dry foliage at the normal or heavy rate prior to the first snow. Repeat in mid-winter when turf is free of snow and immediately after the final snow melt.
	Rovral Green GT	250–375 mL		Apply prior to snow cover and repeat in early spring if conditions for snow mould persist. Use higher rates where severe disease pressure is anticipated or if disease is present at the time of application.
	*Banner MAXX	206 mL		Apply once before snow cover. Do not apply on top of snow or when the temperature is below 0°C. Do not apply more than once a season.
Powdery mildew (*Erysiphe graminis*) Avoid excess nitrogen and shade. Increase air circulation.	*Senator 70 WP WSB	125–250 g	14–21	Apply in a minimum of 24 L and wash into root zone with 2.5 cm of water immediately after application. Apply after mowing or avoid mowing for 12 hours after application. Begin ground applications when diseases first appear. When disease pressure is severe, apply at the higher rate.

Table 5–3. Disease control (replaces Table 5–3, pages 40–47)

Disease and cultural control	Chemical control (highest LD_{50} products listed first)	Rate/100 m^2	Interval (days)	Use enough water for thorough coverage. Follow label directions.
Pythium blight, Cottony blight, Greasy spot *(Pythium aphanidermatum)* Avoid excess nitrogen and watering.	*Heritage MAXX	63 mL	10–14	Begin application before disease is present (usually late May or June) when environmental conditions favour disease development, i.e., relative humidity greater than 90% for at least nine hours, maximum daily temperature of 27.7°C and low temperature of 20°C.
	Terraneb SP	125 g	5–7	Apply as preventive during periods of high temperature and high humidity. Repeat if conditions remain favourable.
	ProTurf Fungicide V	1.45–2.9 kg	5–7	Apply at the recommended rate to moist foliage when high temperatures and humidity favour disease development for prevention or cure.
	*Insignia EG	22.5 g	14	Begin preventative applications when conditions are favourable for disease development.
	Subdue MAXX	16–32 mL	10–21	Apply as a preventive. During periods of prolonged conditions favourable for disease use the lower rate for the shortest interval listed and the higher rate for the longest interval. Under severe disease conditions, use the highest rate and shortest interval specified. Do not make more than three applications a season.
	Chipco Aliette® Signature	200 g		Apply only once when symptoms appear. Use as part of a season-long spray program with other registered pesticides.
Pythium crown and root rot (many *Pythium spp.*)	Supra Captan WDG	60 g		Do not apply more than 120 g/100 m^2 per year. Apply in sufficient water for thorough coverage. Apply before infection occurs.
	Terraneb SP	125 g	7–10	Apply immediately after seeding. Repeat if conditions remain favourable for disease development.
	ProTurf Fungicide V	1.49 kg	7–10	Apply at recommended rate after sowing seed at first sign of disease. Apply to moist foliage of newly seeded grass and repeat if disease persists.
	Subdue MAXX	16–32 mL	7–14	Apply immediately after seeding. Irrigate with 1–2 cm of water. Repeat if conditions are favourable. For long-term control when using seed treated with metalaxyl apply 7–10 days after seeding.
	Chipco Aliette ® Signature	200 g		Apply when symptoms appear. Use as part of a season-long spray program with other registered pesticides. Apply only once a season.

Table 5–3. Disease control (replaces Table 5–3, pages 40–47)

Disease and cultural control	Chemical control (highest LD_{50} products listed first)	Rate/100 m^2	Interval (days)	Use enough water for thorough coverage. Follow label directions.
Pythium crown and root rot (*cont'd*)	Truban	190 g	7–10	Maximum of two applications a year. Apply when symptoms first appear. Use for golf course greens and commercial production.
Moss Commonly associated with low fertility, frequent irrigation, poor drainage, soil compaction, heavy shade, poor air circulation and poorly adapted grasses.	No chemical control available.			
Necrotic ring spot *(Leptosphaeria korrae)* "Frog-eye" symptoms visible all year. Reduce excess thatch. Attacks Kentucky bluegrass and fine fescues. Turf-type perennial ryegrasses and some Kentucky bluegrass varieties are resistant. Provide balanced fertility. Avoid drought stress.	No chemical control available.			
Red thread *(Laetisaria fuciformis)* Avoid nitrogen deficiency, especially on perennial ryegrass and fine fescues.	*Banner MAXX	51 mL		Apply when cool, wet conditions occur. Prolonged periods of high humidity favour disease development. Do not apply more than three times a season.
Rust *(Puccinia spp.)* Use resistant varieties of Kentucky bluegrass and perennial ryegrass. Provide adequate levels of fertility. Mow frequently.	*Insignia EG	12.5 g	14	Apply when conditions are favourable for disease development.
Slime Moulds Remove spore masses by raking or hosing off the turf.	No chemical control available.			
Summer patch *(Magnaporthe poae)* Symptoms usually occur July to August. Attacks annual bluegrass and Kentucky bluegrass. Avoid nitrogen deficiency. Apply light frequent watering during dry periods to reduce heat stress.	*Heritage MAXX	32–63 mL	14–28	Initiate applications when conditions are favourable for disease development. Apply the lower rate at 14-day intervals or higher rate at 28-day intervals.
	*Eagle WSP	18 g	30	Will control only low to moderate disease severity.
	*Banner MAXX	103 mL	30	Apply as a preventive. Apply first when soil temperature >16°C at a 5-cm depth for four consecutive days, with a second application 30 days later. A third application may be required if hot, humid weather occurs. Apply with 13–21 L of water per 100 m^2. Do not apply more than three times a season.

Table 5–3. Disease control (replaces Table 5–3, pages 40–47)

Disease and cultural control	Chemical control (highest LD_{50} products listed first)	Rate/100 m^2	Interval (days)	Use enough water for thorough coverage. Follow label directions.
Take-all patch *(Gaeummannomyces graminis)* Attacks bentgrasses. Use acidifying (ammonium) fertilizers to reduce thatch pH. Avoid drought stress.	*Heritage MAXX (suppression only)	63 mL		Apply one application in the spring when conditions favour infection but prior to disease symptom development. Apply a second application in the fall.

* Alternate or tank mix with one of the other products with different fungicide classification to minimize potential of fungicide resistance developing.

Formulations: EG: water dispersible granule F: flowable ; FF: flowable fungicide ; WDG: water dispersible granule WG: Wettable granule ; WSP: water soluble pouch

ADDITIONS

Table 5–4. Herbicide recommendations for turf (pages 48–50)

Lawns, parks, golf courses and sod farms

PRE-EMERGENCE GRASS HERBICIDES

Active ingredient Trade name (formulation)	Active rate per ha Product rate per ha	Product rate/ac	Comments
corn gluten meal TurfMaize Pro pre-emergent weed seed germination inhibitor with corn gluten	970 kg/ha	388 kg	Inhibits the seed germination of dandelion and smooth crabgrass seed. Apply to established Kentucky bluegrass turf in early spring before smooth crabgrass and dandelion seed germination, or in late summer and early fall after heat stress has passed. Apply when soil is moist and rain is forecasted within two days of treatment. If no rain falls within two days of treatment, irrigate. Excessive moisture at time of treatment may reduce effectiveness of the product. Apply twice per year for best results. Do not apply to newly seeded grass wait until after first mowing when root systems are established. Do not apply if allergic to corn. Do not apply at the same time if over-seeding or re-sodding.
corn gluten meal Ed's Turf Protector Pro pre-emergent weed seed germination inhibitor with corn gluten	970 kg/ha	388 kg	Inhibits the germination of large crabgrass, white clover and dandelion. Apply to established perennial ryegrass or established Kentucky bluegrass turf in early spring two weeks prior to weed seed germination or in late summer or early fall after heat stress has passed. Apply when soil is moist and rain is forecasted within two days of treatment. If no rain falls within two days of treatment, irrigate. Excessive moisture at time of treatment may reduce product's effectiveness.

POST-EMERGENCE GRASS HERBICIDES

Active ingredient Trade name (formulation)	Control program	Active rate/ha Product rate/ha	Comments
bispyribac* Velocity SP			
• Do not apply before June 1st or after September 15th. • Do not retreat if turf is exhibiting undesirable chlorosis. • Do not treat turf unless daily high air temperatures reach 21°C. • Do not apply more than a total of 185 g per ha in a 28 day period. • Do not apply more than a total of 370.8 g per ha per season. • Do not apply more than 140 g per ha per application			
bispyribac* Velocity SP *(cont'd)*	*Program 1* Creeping bentgrass and perennial ryegrass (Golf course fairways and tees mowed at 0.9–1.9 cm height. Sod farms mowed at 1.3–1.9 cm height.)	31 g	Apply on a seven day interval. Continue until the desired level of control of annual bluegrass is achieved. Consider this program for turf where complete removal of annual bluegrass during a single season could result in an unacceptable stand of turf.
	Program 2 Creeping bentgrass and perennial ryegrass (Golf course fairways and tees mowed at 0.9–1.9 cm height. Sod farms mowed at 1.3–1.9 cm height.)	93 g	Apply up to four times on a 14-day interval. Consider this program for turf with light infestation of annual bluegrass, where removal of these weeds would NOT result in an unacceptable stand of turf.
	Kentucky bluegrass and tall fescue program (Sod farms and golf courses)	31 g	Apply on a 7 to 14-day interval. Begin application early in the recommended use season and continue until the desired level of annual bluegrass control is achieved. A shorter mowing height will increase the tolerance of the Kentucky bluegrass and fescue to the herbicide.

POST-EMERGENCE BROADLEAF HERBICIDES

Active ingredient Trade name (formulation)	Active rate/m^2 Product rate/m^2	Comments
Sclerotinia minor Sarritor Domestic Biological Granular Herbicide	40–60 g or 0.2–0.4 g product/plant as a spot treatment	Can be applied when daytime high temperatures are 18–24°C and rainfall or irrigation occurs within 12 hours of application. Apply higher application rate when environmental conditions are suboptimal (i.e. daily maximum temperatures are outside of the optimal range of 18°C–24°C, but not surpass 27°C, and dry) and when the turf is highly infested with dandelion. Avoid direct dosing of desirable broadleaf species or aquatic plants. Several desirable broadleaf species (ornamentals, vegetables, etc.) and aquatic plants, can be damaged when brought in direct contact with the product. A three day post-treatment no-mowing period is recommended. In the first few weeks after application, direct clippings away from desirable broadleaf species and ornamental ponds when mowing.

* golf courses and sod farms only
SP: soluble packet

DELETIONS

Remove all diazinon products and diazinon references from this publication as the active ingredient is no longer registered for use on turf as of Dec. 31, 2005.

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